

## ABSTRACT OF THE INVENTION

The invention presents a method designed to simultaneously measure certain unsaturated lipids and certain vitamins present either as single substances or in complex mixtures such as exist in serum and natural oils. Target lipids are free cholesterol, unsaturated cholesteryl esters; free polyunsaturated fatty acids, and their esters as triglycerides, and phospholipids. Distributions of these analytes over the broad range of serum lipoproteins from chylomicrons to high density fractions are determined using a procedure that involves a single step reaction in which the molecular unsaturations are subjected to non-enzymatic color inducing reagents. For natural oils and vitamins, the same method serves as a quality control procedure. Analytical detection is achieved using broad spectrum absorbance and/or fluorescence measurements. Measured spectra are aggregates of the absorbance contributions from each of the analytes. Data analyses follow two paths. One uses raw spectral data. In the other, multivariate methods of analysis, particularly principal component (or factor) analysis, leads to 2-D and 3-D clustering correlations which have significant diagnostics capabilities for the early detection of human serum disorders and for quality control.

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